

**BY ORDER OF THE COMMANDER
AIR EDUCATION AND TRAINING
COMMAND**



**AIR EDUCATION AND TRAINING
COMMAND INSTRUCTION 90-801**

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**PREVENTION OF HEAT DISTRESS
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This instruction implements AFD 90-8, *Environmental, Safety and Occupational Health Program*. It augments existing Department of Defense (DoD) and Air Force policy for preventing the adverse effects of heat stress to AETC personnel. This instruction applies to all permanent party government employees (military and civilian) assigned to AETC installations, all personnel attending training administered by AETC, and AETC units located at non-AETC installations. It also applies to the Air National Guard (ANG) and Air Force Reserve Command (AFRC) personnel during AETC administered training. It does not apply to training conducted in water or during flight. It also does not apply to contractor personnel. Local AETC units will adjudicate the impact of adjusting AETC civilian employee work hours due to work and rest cycles through local labor management procedures.

Refer recommended changes and questions concerning this instruction to the office of primary responsibility (OPR), HQ AETC/SGPB, using AF Form 847, *Recommendation for Change of Publication* at 63 Main Circle, Suite 3, Randolph AFB, TX 78150-4549, or E-mail to AETC.SGWorkflow@us.af.mil. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS) located at <https://www.my.af.mil/afirms/afirms/afirms/rims.cfm>. Attachment 1 is a glossary of references and supporting information used in this publication.

(VANCEAFB) This supplement implements and extends the guidance within Air Force Policy Directive (AFPD) 48-1, Aerospace Medicine Enterprise, 23 August 2011, Air Force Pamphlet 48-151 AFGM 3, Thermal Injury, 24 April 2012 and Air Education and Training Command Instruction (AETCI) 90-801, Prevention of Heat Stress Disorders, 19 April 2012. It applies to all Air Force military and civilian personnel assigned to Vance Air Force Base (Vance AFB). Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and are disposed of in accordance with the Air Force Records Information Management System (AFRIMS) Air Force Records Disposition Schedule (RDS) located at <https://my.af.mil/afirms/afirms/afirms/rims.cfm>. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Form 847 from the field through the Vance AFB Publications and Forms Manager. (AF Form 847 is prescribed in AFI 11-215, USAF Flight Manuals Program [FMP]. Refer to that publication for guidance on filling out the form.)

SUMMARY OF CHANGES

During mission-essential training, contingency, or emergency operations, squadron commanders may waive the provisions of this instruction using established AF risk management processes. However, when commanders waive procedures they must ensure all supervisors exercise caution, make certain all supervisors and subordinate personnel are aware of heat stress disorder signs and symptoms, and take actions to protect the health of their personnel. Military operations and training are inherently risky. This instruction aims to reduce the risk of heat stress disorders during AETC operations and directs the use of AFPAM 48-151, *Thermal Injury*, for compliance with this instruction.

(VANCEAFB) The AETCI 48-101 was changed to AETCI 90-801. The AFPAM 48-151 was added as part of guidance reference.

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1. Responsibilities:

1.1. HQ AETC Directorates:

1.1.1. HQ AETC/SGPB: OPR for this instruction. Provides consultation with AETC MTFs, as requested, regarding requirements within this instruction.

1.1.2. HQ AETC/A3TH: Provides consultation on AETC Force Fitness as it applies to this instruction.

1.2. **Numbered Air Force Commanders:** Ensure procedures are established at AETC wings to comply with this instruction.

1.3. **Wing Commanders:** Establish procedures to implement this instruction.

1.3. **(VANCEAFB)** Supervisors will maintain a copy of AETCI 90-801 for use when developing work/rest cycles for personnel who may be occupationally exposed to heat stress.

1.4. Group and Squadron Commanders:

1.4.1. Implement activity levels and fluid replacement requirements for personnel in training status.

1.4.2. Ensure supervisors brief personnel annually on the requirements of this instruction, the local supplement (if any), and unit-specific procedures to minimize the risk of heat stress disorders.

1.4.3. Ensure the application of AF risk management process and operational considerations are followed when waiving provisions of this instruction to meet operational mission or training requirements. Figure 1 provides a “Heat Strain Decision Process”.

1.5. Supervisors (in organizations where work/training processes may involve potential heat stress exposures):

1.5.1. Brief workers and AETC military training instructors/leaders annually on the requirements of this instruction, any local supplement, and unit-specific procedures to minimize the risk of heat stress disorders. Document training in accordance with AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*.

1.5.2. Plan activities to meet the requirements of this instruction, as applicable, and educate personnel and trainees on proper water intake, work/training restrictions, and rest requirements.

1.5.3. Disseminate the heat category and flag color conditions to workers and trainees when informed through established notification procedures.

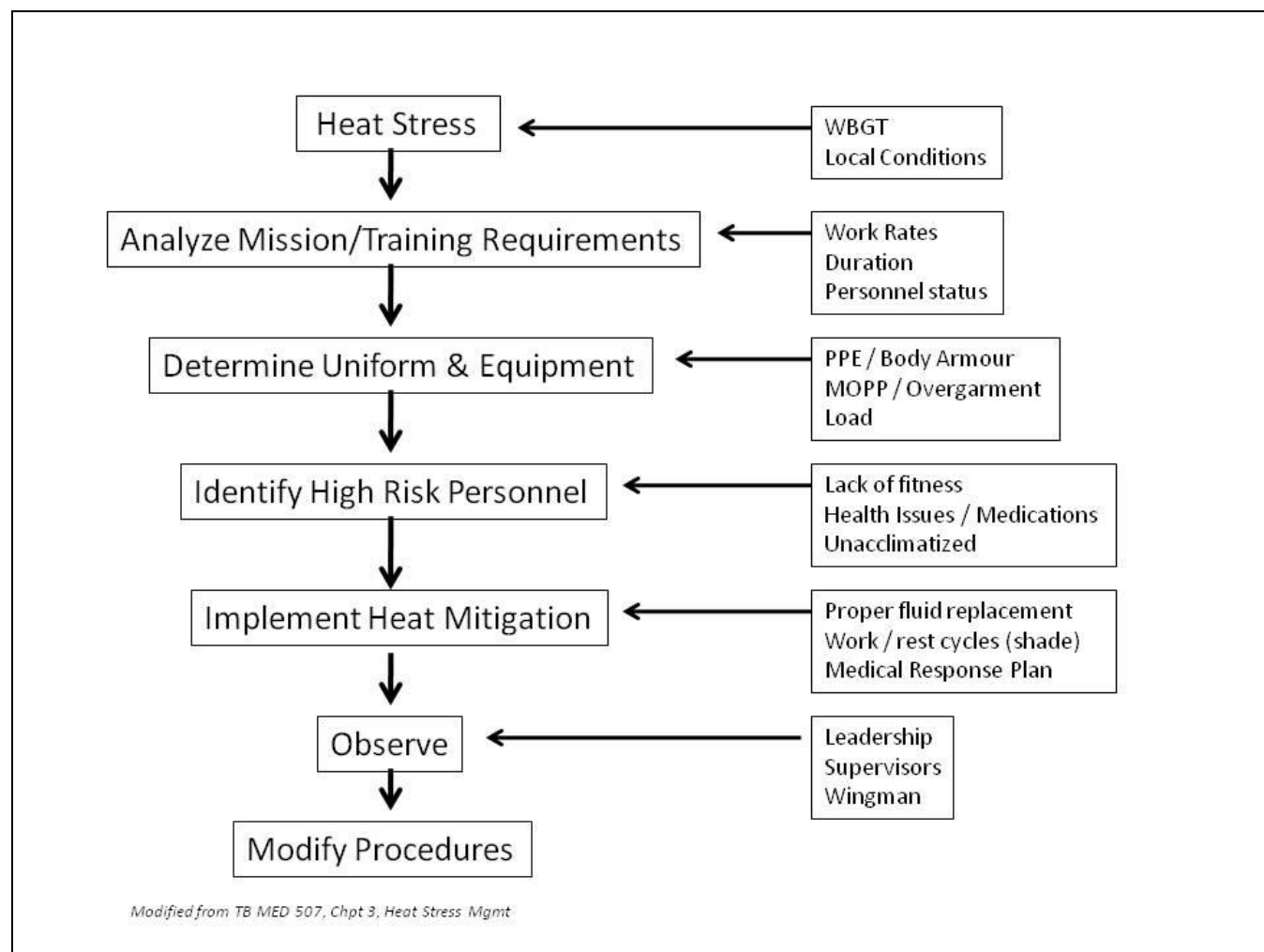
1.5.4. Identify workers or trainees displaying signs and symptoms of heat stress and implement appropriate actions.

1.5.5. Consult with representatives of the aerospace medicine squadron or flight, as needed, to verify acclimatization levels and appropriate curtailment recommendations unique to specific work or training requirements.

1.5.6. Consider principles of acclimatization when planning outdoor activities in hot environments.

1.5.7. Consult with Squadron Commanders to waive provisions of this instruction using risk management processes and operational considerations (Figure 1).

Figure 1.1. Heat Strain Decision Process



1.6. Medical Service. Aerospace medicine squadrons/flights contain a unique collection of expertise to assist unit commanders and supervisors. Commanders may wish to use this expertise to educate installation, tenant, and remotely located units on the medical aspects of this instruction. Specific functional area responsibilities are assigned below:

1.6.1. Flight Medicine:

1.6.1.1. Advise unit commanders and supervisors on prevention of heat stress.

1.6.1.2. Provide consultation, with MTF Chief of Medical Staff (SGH), to clinical providers regarding duty limitations and profiles related to heat stress in accordance with AFI 10-203, *Duty Limiting Conditions*.

1.6.2. Public Health:

1.6.2.1. Assist supervisors in developing appropriate training materials for supervisors, workers, and trainees.

1.6.2.2. Ensures heat stress related occupational illness data is collected and reported in accordance with AFI 48-145, *Occupational and Environmental Health Program*.

1.6.2.3. **(Added-VANCEAFB)** 71 MDOS/SGOAM (Public Health) assists in investigating heat illness incidents.

1.6.3. Bioenvironmental Engineering (BE):

1.6.3.1. Determines the appropriate procedures to measure and report the WBGT index in accordance with AFPAM 48-151, *Thermal Injury*.

1.6.3.2. Incorporates heat stress evaluations into the routine and special surveillance programs established by AFI 48-145, *Occupational Health Program*.

1.6.3.2. **(VANCEAFB)** 71 MDOS/SGOQB (Bioenvironmental Engineering) will notify the Vance Command Post by telephone when measured Wet Bulb Globe Temperature (WBGT) levels exceed 81.9 degrees Fahrenheit (°F). WBGT will be reported on days with a forecast or observed high temperature >85 °F, with a minimum of four measurements during the hottest part of the day. A log of these readings will be maintained by 71 MDOS/SGOQB. The Command Post will disseminate this information to military commanders of all affected areas.

1.6.3.3. Annually certifies the competency of other installation functional areas assessing environmental conditions for heat stress. NOTE: This does NOT apply to Weather Squadrons/Flights or trained medical personnel (such as IDMTs) attached to AETC Training units.

1.6.3.4. **(Added-VANCEAFB)** Bioenvironmental Engineering will notify the Vance Command Post by telephone of the WBGT stage. These stages are as follows:

Stages	Temperature Range	Flag Color
1	<81.9 °F WBGT	No Flag Required
2	82 – 84.9 °F WBGT	Green
3	85 – 87.9 °F WBGT	Yellow
4	88 – 89.9 °F WBGT	Red
5	>90 °F WBGT	Black

1.6.3.4.1. **(Added-VANCEAFB)** The Command Post will disseminate this information via the Networked Alerting System (alerts all personnel through computer updates of current heat stress categories) and the base pager system.

1.6.4. Aerospace Physiology:

1.6.4.1. Assists operational leadership and other subject matter experts in identifying and recommending countermeasures to human performance and safety threats related to heat stress disorders.

1.6.4.2. Assists other Aerospace Medicine subject matter experts in human performance enhancement (HPE) training for all appropriate military personnel to reduce occupational/training injuries/illnesses due to heat stress.

1.6.5. Clinical Providers:

1.6.5.1. Must implement procedures to notify the public health flight of any heat stress disorder associated with work or training activities as required by paragraph 8.3.

1.6.5.2. Must be educated at least annually on this instruction and any local supplement, emphasizing their role in establishing recommendations or other restrictions during the hot season for workers and trainees who have been ill.

1.6.6. **(Added-VANCEAFB)** The dry bulb and dew point temperatures for the Index of Thermal Stress (ITS) will be calculated by 71 OSS/OSW and included in the observation for the Supervisor of Flying (SOF). The SOF will determine the appropriate zone and notify each flying squadron and base operations.

2. Assessing Environmental Conditions for Heat Stress:

2.1. Measuring deep body temperature is impractical for monitoring heat load; therefore, environmental factors must be measured. Detailed analysis of the influence of the environment on thermal stress requires a knowledge of the following 4 basic parameters; air temperature; mean radiant temperature, air speed and absolute humidity. The Wet-Bulb Globe Temperature (WBGT) index is the simplest and most suitable technique to measure environmental factors that most nearly correlate with deep body temperatures and other physiological responses to heat. Refer to the AFPAM 48-151, Chapter 3, for more information.

2.2. Training squadrons and flights may perform WBGT measurements to determine the WBGT index during specific operational activities. Use the portable hand-held WBGT kit (NSN 6665-00-159-2218), or a suitable commercially available instrument. Measurements shall represent the conditions that most closely relate to the training or working conditions. BE must annually certify the competency of any other functional area in taking and reporting these measurements, except as defined in paragraph 1.6.3.3. of this instruction.

3. General Requirements to Prevent Heat Stress Disorders. Personnel working and/or training in hot environments must be educated on the causes, signs and symptoms, first-aid treatment, and prevention of heat disorders. Supervisors and training instructors will follow the guidelines in AFPAM 48-151, Chapter 4, unless specific heat stress prevention topics are included as part of a standard course curriculum.

4. Provisions for AETC Trainees:

4.1. Personnel Attending Training Administered By AETC.

4.1.1. Personnel attending training administered by AETC are subject to the requirements of this instruction. Detachments and operating locations (OL) on other than an AETC base will coordinate with the host base bioenvironmental engineer or other preventive medicine personnel to determine the method used to locally determine the WBGT index and disseminate its value.

4.1.2. Supervisors and instructors will follow work/rest cycle guidelines in Attachment 2 (and AFPAM 48-151, Attachment 5), unless specifically waived per paragraphs 1.4.3 and 1.5.7. of this instruction. **NOTE:** The Army, Navy, and Marine Corps have similar guidelines for heat stress based on the WBGT index. Additionally, most Air Force

installations have local procedures in place to determine WBGT during periods of hot weather.

4.2. AETC Personnel Attending Training Not Administered By AETC. AETC personnel attending training not administered by AETC (for example, training administered by the Army, Navy) will follow the guidelines established by that unit, at that installation, instead of the guidance contained in this instruction.

4.3. Heat Injury Prevention for the Battlefield Airman (BA) and Security Forces (SF) trainees.

4.3.1. Heat injury prevention is a high priority in the preparation and training of BA and SF. In order to overcome the inherent training restrictions created by exclusively following the work/rest cycles in Attachment 2, Training Wings/Training Groups (TRG) will work in partnership with Safety and Preventive Medicine physicians to produce a strategic, comprehensive set of heat injury prevention countermeasures. This approach provides a level of heat injury prevention that far exceeds the work/rest cycles in Attachment 2, while assuring training standards and mission goals are accomplished.

4.3.2. Heat injury prevention will be targeted to the unique needs of each training objective/course, and will be taught and integrated into the risk management aspects of each course. A defined risk management matrix will be developed for each high risk training event.

4.3.3. Heat injury prevention elements of the TRG's risk management process matrix will be reviewed and approved by local preventive medicine physicians upon initial development and re-reviewed in the event of any heat injuries.

5. Preventing Heat Stress Disorders During Physical Conditioning (PC) Activities. AF fitness testing and unit fitness training programs will follow the requirements in AFI 36-2905, *Fitness Program*.

6. Preventing Heat Stress Disorders in Occupational Work Environments (Nontraining--Includes emergency response to real-world and contingency exercises):

6.1. Personnel who routinely perform work while exposed to hot environments are occupationally exposed to heat stress. Wearing personal protective equipment and/or combat gear will significantly increase heat stress during strenuous activity.

6.2. Supervisors of occupationally exposed personnel should use AFPAM 48-151, Attachment 6, to plan work and rest cycles for individuals under their control.

6.3. Exposures above 90 °F WBGT should be allowed only when performing mission-essential duties, and then only with caution. If possible, two or more details should be arranged to work in sequence to ensure each crew receives the proper work and rest cycle. Waiver authority, per paragraph 1.4.3., extends to Incident Commanders (IC) of emergency responses/exercises and Troop Commanders (TC) of contingency/readiness exercises/responses.

6.4. During Compliance Inspections (CI), AETC/IG shall be briefed on wing/unit heat prevention procedures and evaluate the risk management program to ensure all steps are adequately addressed.

7. Recognition, First-Aid Treatment, and Investigation of Heat Stress Disorders:

7.1. There are several recognized heat stress disorders described in Attachment 1, Terms. Individuals must be trained to recognize when they or their fellow trainees or workers are experiencing the signs and symptoms of any of these disorders. Early signs and symptoms and actions are identified in Figure 2, along with the later signs and symptoms and immediate actions to respond to such individuals.

7.2. For any medical intervention due to potential heat illness for military or civilian employees, the healthcare provider will contact public health to initiate an Occupational Illness/Injury Investigation Report. Occupational illness and injuries will be determined and reported according to AFI 91-204, *Safety Investigations and Reports*.

7.3. For personnel who become ill and are returned to duty during the hot season, a clinical provider will recommend whether or not additional restrictions are required to prevent heat stress disorders. The clinical provider will annotate these recommendations and any other restrictions or modifications to the individual's physical training and outdoor activities on AF Form 469, or locally developed equivalent for trainees.

7.3. (VANCEAFB) Health care providers will investigate heat illness incidents. Personnel who "fall out" (i.e., exhibit signs of heat stress) must be reported to 71 MDOS/SGOAM within one duty day by the supervisor in charge of the detail.

Figure 1.2. Heat Stress and Water Intoxication Warning Signs and Symptoms.

EARLY SIGNS AND SYMPTOMS	ACTIONS
<ul style="list-style-type: none"> • Dizziness • Headache • Dry mouth • Unsteady walk • Weakness • Muscle cramps 	<ul style="list-style-type: none"> • Remove from training • Allow casualty to rest in shade • Take sips of water • If signs or symptoms do not improve in 15 to 30 minutes, transport to medical facility • If signs or symptoms worsen, call ambulance
LATER SIGNS AND SYMPTOMS	IMMEDIATE ACTIONS
<ul style="list-style-type: none"> • Hot body, high temperature • Confusion, unresponsiveness, coma • Vomiting • Involuntary bowel movement • Convulsions • Weak or rapid pulse 	<ul style="list-style-type: none"> • Call ambulance for immediate transport to hospital • Lay person down in shade with feet elevated until ambulance arrives • Give <u>sips</u> of water while waiting for ambulance • Begin active cooling, if skin is hot to touch • Undress as much as possible • Pour cool water over person and fan

7.4. (Added-VANCEAFB) Military personnel and government civilians who "fall out" must report to the 71 MDG for evaluation, and if necessary, receive treatment at the time of the event.

8. Local AFI Supplements. Each AETC installation should consider developing a supplement to this instruction. As a minimum, the local supplement should:

- 8.1. Identify who measures the WBGT index, where the measurements will be performed, and when and how often they will be taken.
- 8.2. Establish procedures to document WBGT measurements for later retrieval.
- 8.3. Establish notification procedures to ensure all base units (such as training squadrons, base gym, etc.) know when the WBGT heat conditions are reached or change. The preferred method should include flag posting; however, any other method may be used at the discretion of the wing commander. For bases where WBGT stage flags are used, the local supplement to this instruction will establish flag-posting locations and procedures.
- 8.4. Establish local policy on training activities that may and may not be conducted during each heat condition. Consider risk management procedures when developing local supplements to establish unit policies.
- 8.5. Identify unique training situations that warrant direct medical support and the details of the required support.
- 8.6. Establish procedures to evaluate trends in heat-related illnesses.
- 8.7. Describe procedures for medical notification of course supervisors of any trainees at increased risk of heat stress disorder due to illness or medication.

9. Applying Risk Management Process: Units presently conducting training and exercises exceeding the work limitations contained AFPAM 48-151, must apply and document deliberate risk management procedures as defined in AFPD 90-8, *Environment, Safety & Occupational Health Management and Risk Management*.

MARY ARMOUR, Colonel, USAF, NC
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(VANCEAFB)

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Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

DODD 4715.1E, *Environment, Safety, and Occupational Health*, 19 Mar 05

DODI 6055.05, *Occupational and Environmental Health*, 11 Nov 08

DODI 6055.1, *DoD Safety and Occupational Health (SOH) Program*, 19 Aug 98

(Added-VANCEAFB) AETCI 90-801, *Prevention of Heat Stress Disorders*, 19 April 2012

(Added-VANCEAFB) AFPAM 48-151 AFGM 3, *Thermal Injury*, 24 April 2012

AFPD 48-1, *Aerospace Medical Program*, 23 Aug 11

(Added-VANCEAFB) AFPD 48-1, *Aerospace Medicine Enterprise*, 23 August 2011

AFPD 90-8, *Environment, Safety & Occupational Health Management and Risk Management*, 1 Sep 04

AFI 10-203, *Duty Limiting Conditions*, 25 Jun 10

AFI 48-123, *Medical Examinations and Standards*, 24 Sep 09

AFI 48-145, *Occupational Health Program*, 15 Sep 11

AFI 91-204, *Safety Investigations and Reports*, 24 Sep 08

AFMAN 33-363, *Management of Records*, 1 Mar 08

AFMAN 48-153, *Health Risk Assessment*, 28 Mar 07

AFPAM 10-100, *Airman's Manual*, 1 Mar 09

AFPAM 48-151, *Thermal Injury*, 18 Nov 02

AFPAM 48-152(I)/TB MED 507, *Heat Stress Control and Heat Casualty Management*, 7 Mar 03

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MIL STD 882-D, *Standard Practice for System Safety*, 10 Feb 00

HQ AFMOA/SG3P policy ltr, *Transitioning to the New Air Force Safety Automated System (AFSAS) Occupational (Occ) Illness Module*, 22 Aug 08

Epidemiology of Hospitalizations and Deaths from Heat Illness in Solders, Carter, R., Chevront, S., Williams, J.O., Kolka, M.A., Stephenson, L.A., Sawka, M.N., Amoroso, P.J., *Med.Sci.Sports Exerc.*, Vol 37, No. 8, pp 1338-1344, 2005.

Heat Related Illnesses, Carter, R., Chevront, S.N., Swaka, M.N., *Sports Science Exchange*, Vol 19, No. 3. pp 1-6, 2006

Abbreviations and Acronyms

AETC—Air Education and Training Command

(Added-VANCEAFB) AETCI—Air Education and Training Instruction

(Added-VANCEAFB) **AFGM**—Air Force Guidance Memorandum
(Added-VANCEAFB) **AFPAM**—Air Force Pamphlet
(Added-VANCEAFB) **AFPD**—Air Force Policy Directive
(Added-VANCEAFB) **AFRDS**—Air Force Records Disposition Schedule
(Added-VANCEAFB) **AFRIMS**—Air Force Records Information Management System
BA—Battlefield Airman
BE—bioenvironmental engineering
BG—black globe
DB—dry bulb
(Added-VANCEAFB) **°F**—Degrees Fahrenheit
IC—Incident Commander
IDMT—Independent Duty Medical Technician
(Added-VANCEAFB) **ITS**—Index of Thermal Stress
(Added-VANCEAFB) **MDG**—Medical Group
(Added-VANCEAFB) **MDOS**—Medical Operations Squadron
OL—operating location
OPR—Office of Primary Responsibility
(Added-VANCEAFB) **OSS**—Operations Support Squadron
PC—physical conditioning
RM—Risk Management
SF—Security Forces
(Added-VANCEAFB) **SOF**—Supervisor of Flying
TC—Troop Commander
WBGT—wet bulb, globe temperature

Terms

Acclimatization—A period of adjustment an individual's body requires to become accustomed to working in hot environments. Full acclimatization occurs through progressive degrees of heat exposure and physical exertion. Personnel may need 2 weeks of increasing exposures to become substantially acclimated and may retain most of their adaptation for about 1 week after leaving a hot climate. Workers in good physical condition acclimate more quickly.

Heat Stress—Heat stress is the combination of environment and physical work factors that constitute the total heat load imposed on the body. The environmental heat stress factors are air temperature, radiant heat exchange (example, sunlight), air movement, and relative humidity. Physical work contributes to total heat stress through the body's production of heat (metabolic heat) as it burns energy to sustain the work. This production of metabolic heat depends on the

intensity of the physical effort that is affected, in turn, by body size, muscular development, physical fitness, and age.

Heat Stress Disorders—Heat stress disorders or heat disorders are general terms used to indicate any type of adverse health problem related to heat. Heat syncope, cramps, exhaustion, and stroke are all forms of heat stress disorders. Heat disorders may be recognized by one or more of the following symptoms: nausea, vomiting, fever, dizziness, headache, faintness, abnormal sweating, convulsions, lack of coordination, mental confusion, and abdominal or leg cramps. The personnel most likely to be affected by the heat are those who have just arrived from cooler regions of the country, are obese, or are in poor condition. A list of heat stress disorders follows:

Heat Cramps—Painful intermittent spasms of the muscles used during work (arms, legs, or abdominal) may occur during or after work hours. Cramps may result from exposure to high temperature for a relatively long time, particularly if accompanied by hard physical work. Cramps usually occur in unacclimatized personnel after heavy sweating and are the result of excessive loss of salt from the body. Even if the moisture is replaced by drinking water, the loss of salt by sweating may provoke heat cramps.

Heat Exhaustion—The signs of heat exhaustion are profuse sweating, weakness, rapid pulse, dizziness, nausea, and headache. The body temperature is elevated with heat exhaustion, although not to the same degree as with heat stroke. Heat exhaustion is caused by a deficiency of water and/or salt intake and circulatory strain from competing demands for blood flow to the skin and to active muscles. Can progress to heat stroke rapidly if not treated immediately.

Heat Stroke—Heat stroke is a medical emergency and is caused by exposure to a hot environment in which the body is unable to cool itself sufficiently. This results in the body temperature rising rapidly. With classic heat stroke, hot dry skin may be present. This should be anticipated in older or debilitated individuals. With exertional heat stroke, sweating continues. It is often preceded by nausea or vomiting, abnormal shivering, and/or confused mental status with slurred speech. In highly motivated individuals, the only sign before collapse and unconsciousness may be heavy sweating. Increased body temperature, if uncontrolled, may lead to delirium, convulsions, coma, and even death. Heat stroke is a much more serious condition than either heat cramps or heat exhaustion.

Heat Syncope—Fainting that occurs immediately after exertion without proper cool down or while standing erect and immobile in heat. Caused by pooling of the blood in dilated vessels and the lower parts of the body.

Hyponatremia (Acute Water Intoxication)—Condition in which the level of sodium in the blood is markedly lowered as a result of sodium lost in sweat, coupled with fluid replacement using only large volumes of plain water (greater than 1 1/2 quarts per hour). This is a medical emergency. Hyponatremia is a life-threatening condition that may result in confusion, fatigue, muscle cramps, and nausea early on, followed later by vomiting, unconsciousness, seizures, and death if not recognized and treated promptly. This condition is difficult to distinguish from heat exhaustion and heat stroke, and if suspected should be treated immediately in a medical facility.

Wet Bulb, Globe Temperature (WBGT) Index—The WBGT index is a combination of temperature measurements that factor dry air temperature, air movement, relative humidity, and

radiant heating. The equation for the WBGT index uses dry bulb (DB), natural wet bulb (NWB), and black globe (BG) temperatures.

Attachment 2

WORK REST CYCLES AND WORKLOAD EXAMPLES

Figure A2.1. Tables 1 & 2. Work Rest Cycles and Fluid Replacement (copied from AFPAM 48-151, Atch 5)

TRAINING GUIDELINES FOR ACCLIMATIZED AND UN-ACCLIMATIZED PERSONNEL WEARING HOT WEATHER BDU

Table .1. Training Guidelines for Average Acclimatized Airmen Wearing BDU, Hot Weather.

Heat Cat/Flag Color	WBGT (F)	EASY WORK		MODERATE WORK		HARD WORK	
		Work Rest Cycle	Water Intake Qt/hr	Work Rest Cycle	Water Intake Qt/hr	Work Rest Cycle	Water Intake Qt/hr
1	78 - 81.9	No Limit	0.5	No Limit	0.75	40/20 min	0.75
2	82 - 84.9	No Limit	0.5	50/10 min	0.75	30/30 min	1.0
3	85 - 87.9	No Limit	0.75	40/20 min	0.75	30/30 min	1.0
4	88 - 89.9	No Limit	0.75	30/30 min	0.75	20/40 min	1.0
5	> 90	50/10 min	1.0	20/40 min	1.0	10/50	1.0

Table .2. Training Guidelines for Average Unacclimatized Airmen Wearing BDU, Hot Weather.

Heat Cat / Flag Color	WBGT (F)	EASY WORK		MODERATE WORK		HARD WORK	
		Work Rest Cycle	Water Intak Qt/hr ^a	Work ^b Rest ^c Cycle	Water Intake Qt/hr	Work Rest Cycle	Water Intake Qt/hr
1	78 - 81.9	No Limit	0.5	50/10 min	0.75	30/30 min	0.75
2	82 - 84.9	No Limit	0.5	40/20 min	0.75	30/30 min	1.0
3	85 - 87.9	No Limit	0.75	30/30 min	0.75	20/40 min	1.0
4	88 - 89.9	50/10 min	0.75	20/40 min	0.75	10/50 min	1.0
5	> 90	40/20 min	1.0	10/50 min	1.0	Not allowed	Not applicable

NOTES:

1. These values will sustain performance and hydration for at least 4 hours of work in the specified heat category. (Values are based on US Army Research Institute for Environmental Medicine recommendations; US Army policy.)
2. This table is based on studies of personnel wearing military BDU clothing. When performing activities with ground crew ensemble, fire-fighting gear, or other restrictive or impermeable clothing, make arrangements for remote site measurement of the WBGT and add 10 °F to the measurement (add 15 °F if also wearing body armor). When wearing typical athletic training gear (shorts & t-shirt), commanders and supervisors may adjustment or waive requirements of this table, based on consultation with local medical subject matter experts.
3. Rest means minimal physical activity (sitting or standing) accomplished in the shade if possible (but not necessary).
4. Individual water needs will vary +/- 1/4 quart per hour.

CAUTION: Hourly fluid intake should not exceed 1 1/2 quarts; daily fluid intake should not exceed 12 quarts. Rapid ingestion of large amounts of water (greater than 1 1/2 quarts per hour) may lead to hyponatremia (acute water intoxication), which is a life-threatening

condition that may lead to weakness, convulsions, loss of consciousness, and death if not recognized and treated promptly.

Figure A2.2. Work Load Examples. [From AFPAM 48-151 Table A6.2; TB Med 507 Table 3-1]

Easy Work

1. Walking hard surface at 2.5 miles per hour (mph), < 30 pound (lb) load
2. Weapon maintenance
3. Marksmanship training
4. Drill and ceremony
5. Repair, airplane or automobile
6. Repair, wiring, plumbing
7. Occupation, carpentry, general
8. Occupation, walking 3.0 mph, moderately and carrying light objects < 25 lbs
9. Occupation, walking on job, < 2.0 mph, very slow
10. Occupation, police, directing traffic (standing)

Moderate Work

1. Walking hard surface at 3.5 mph, < 40 lb load
2. Walking loose sand at 2.5 mph, no load

3. Walking, carrying 1 - 15 lb load, upstairs
4. Individual movement techniques, such as low crawl, high crawl
5. Calisthenics
6. Defensive position construction
7. Cleaning, heavy or major (for example, wash car, wash windows, mop)—vigorous effort
8. Conditioning exercise, calisthenics light or moderate effort
9. Lawn and garden, mowing lawn, walk, power mower
10. Repair, painting, papering, plastering, scraping

Hard Work

1. Walking hard surface at 3.5 mph, \geq 40 lb load
2. Walking loose sand at 2.5 mph with load
3. Walking, carrying 16 - 49 lb load, upstairs
4. Running, 5 mph (12 minutes per mile)
5. Lawn and garden, mowing lawn, hand mower
6. Occupation, truck driving, loading and unloading truck (standing)
7. Occupation, moving, pushing heavy objects, 75 lbs or more (desks, moving van work)
8. Conditioning exercise, calisthenics (push-ups, pullups, situps)—heavy, vigorous effort
9. Occupation, carrying heavy loads (such as bricks)
10. Occupation, carrying moderate loads upstairs, moving boxes (16 - 40 lbs)

Attachment 3

ACCLIMATIZATION

A3.1. Acclimatization is defined as the adaptive changes that occur when an individual undergoes repeated or prolonged heat exposure and the concomitant reduction in physiological strain produced by the hot environment. Acclimatization is achieved by repeated exposures to a heat stress sufficient to raise internal body temperature to levels that provoke moderate to profuse sweating; this is most effectively accomplished by exercising or working in the heat. Acclimatization to heat begins with the first exposure; at least 7 to 14 days of exposure are required to reach approximately 95 percent of maximal physiological response.

A3.2. Higher levels of aerobic conditioning from exercise in thermoneutral or cool environments provide a partial degree of acclimatization, but not complete acclimatization. Also, acclimatization is specific to the environmental vapor pressure; that is, adaptations to hot-humid conditions are different than those to hot-dry conditions. Individuals who will exercise or work in the heat should increase their state of acclimatization by gradually increasing exercise or work exposure during the approximately 2-week period before the scheduled activity. Supervisors must note that several factors, including inter-individual differences, affect the rate and magnitude of acclimatization.

A3.3. When an unacclimatized worker is exposed to heat, he or she may experience some discomfort and signs of heat strain, such as high body temperature, increased heart rate, and fatigue on the first day. On each succeeding day, the worker's ability to perform at the same level of heat stress improves as signs of discomfort and strain diminish. During the approximately 2 weeks it takes to acclimatize, the worker should be especially aware of the signs and symptoms of heat stress disorders and should drink an adequate quantity of water as indicated in Table 2. After a period of approximately 2 weeks, a worker should be able to perform all tasks without difficulty.

A3.4. Individuals who are seasonally exposed to strenuous duties or heavy work undergo acclimatization each year. This may occur during regular duty or work as outside temperatures increase during the spring and summer.

A3.5. Supervisors of personnel in training status will use the activity level restrictions in Tables 1 and 2 to plan and conduct outdoor training and troop movements for individuals under their control. Paragraph 6 addresses recommendations for single training events conducted solely for the purpose of physical conditioning (PC). All trainees will be considered unacclimatized unless exposed to increasing levels of exertion in WBGT heat conditions. The actual number of days to acclimate will depend on many factors and will be determined for each course based on the training schedule and prior heat category levels during the acclimatization process.

A3.6. Although trainees may eventually become acclimated, the body's tolerance to heat may be reduced based on pre-existing health conditions. Trainees must be educated to inform instructors of these conditions so that proper adjustments in training activities can be made. Depending upon the seriousness of the condition, these adjustments can include more closely observing the affected personnel, reducing the activity rate and/or time, or referring the trainee to a clinical provider for an evaluation.